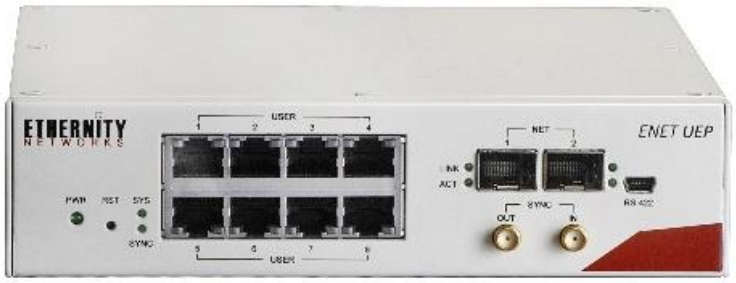
ENET UEP-20 Universal Edge Platform

The ENET UEP-20 Universal Edge Platform is the ideal programmable network appliance for telco/cloud network edge applications, offering high networking and security performance with modularity to support virtually unlimited flexibility in protocol and port configurations.



Today, the number of users accessing network services is growing, and each subscriber may have multiple devices using apps that require high bandwidth and low latency. Moreover, with the growth of the Internet of Things (IoT), there can be tens of thousands of sensors sending and receiving data at any given moment, placing great strain on the network in terms of both performance and power demands. The rapid growth for new services is everywhere and it comes with a need for mobility and higher bandwidth.

To meet this demand, service provides are rapidly upgrading their infrastructure, moving from 1Gbps demarcation to 10G, and even up to 100G connections to the network edge and aggregation. This transmission also requires new intelligent capabilities such as time-sensitive autonomous systems and encrypted connections, all without compromising performance. Moreover, this performance must be provided using limited space with low power consumption, as the sites at the edge that host the network equipment have not changed.

Key Benefits

Multiple forwarding technologies
FPGA-based state of the art forwarding architecture for L2, L3 IPv4/IPv6 and MPLS service demarcation, and SyncE/IEEE 1588

Advanced traffic management and QoS
H-QoS with 3 levels of traffic management and policing schemes

Design for 1GbE to 10GbE migration
1Gbps-to-10Gbps aggregation and demarcation

Seamless integration for NFV acceleration
Directly connect PCIe bus to accelerate any server with NFV applications for mobile and access services

Ethernity's ENET UEP-20 is a modular network appliance targeted for network edge infrastructure solutions. The base ENET UEP-20 device offers up to 40Gbps of networking capacity and 10Gbps of IPSec VPN performance with virtually unlimited flexibility in protocol and port configurations, as well as a dual-core ARM processor for running the control stack.

The ENET UEP-20 comes with SFP+ interfaces that can be equipped with 10GbE or XGS-PON transceivers, and an FPGA equipped with Ethernity's ENET Flow Processor, implementing a complete Carrier Ethernet switch, hierarchical QoS, routing, IPSec, with built-in support for more options such as XGS-PON MAC.

With its embedded ARM processing cores that handle the control plane, the ENET UEP-20 is a standalone high-end Network Interface Device (NID) that offers powerful router and IPSec functionality.

The ENET UEP-20 offers optimum modularity through its interchangeable mezzanine card, which enables the appliance to be designed to support other interfaces such as G.fast, enterprise Power over Ethernet (PoE) solutions, IoT aggregation elements, or additional connectivity via 1/10GbE interfaces. The default ENET UEP-20 offers 8 x 1Gb RJ45 ports in the mezzanine card.

Product Highlights

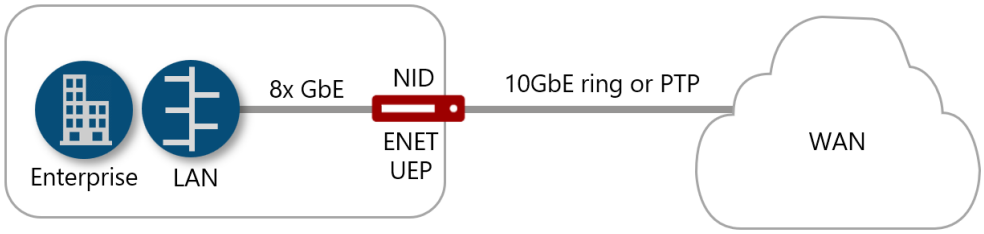
- Modular appliance
  - 2 x 10GbE ports
  - 8 x 1GbE ports
- Low space, low power – ideal for network edge infrastructure
- Programmable FPGA-based flow processor to handle fully compliant Carrier Ethernet switch/router demarcation services:
  - L2 MEF 3.0
  - H-QoS
  - OAM support
  - IPv4/IPv6
  - MPLS and PWE
  - IPSec tunneling
  - Overlay methods:
    - NVGRE, VxLAN, L2TP, PPPoE
- Dual-core ARM processor to manage control plane protocols
- PCIe extender
  - Connect any standard server running NFV environment to offload networking and security functions
- IEEE 1588 and SyncE*

(*) Hardware ready

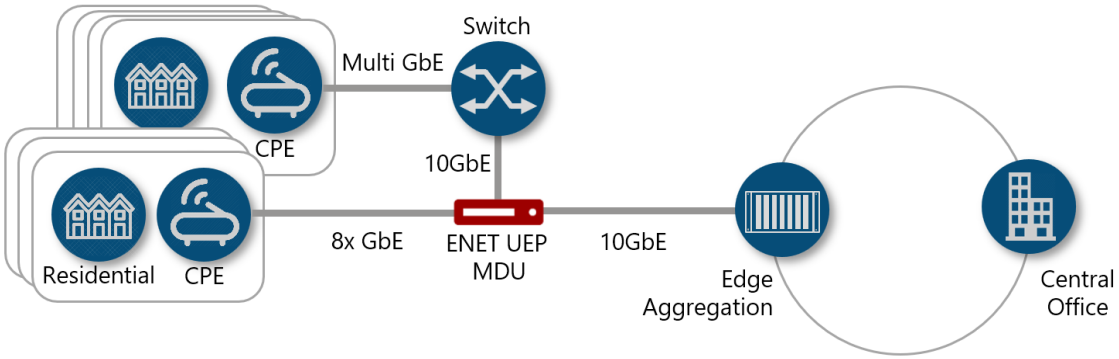
ENET UEP Applications

High-End NID

Thanks to its two ARM processing cores, the ENET UEP-20 is able to handle all control functions, while the onboard FPGA handles the data path. By combining this control capability with the 8 x 1GbE RJ45 ports, the ENET UEP-20 is perfectly suited to serve as a high-end network interface device (NID) for demarcation of the WAN from the LAN networks. Moreover, the FPGA enables full routing functionality and IPSec security as add-ons to the NID, saving both space and cost at the network edge. The device can be arranged with 2 x 10GbE connectivity for LAG, ring, or cascading topologies, or with 1 x 10GbE and a second 10GbE port for 1:1 failover backup:



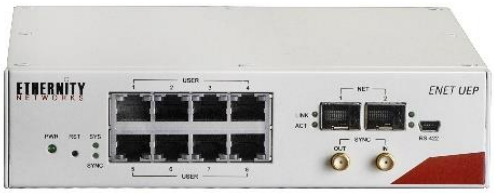
An additional 10G interface can attach to any standard switch for even greater distribution capacity:



PCIe Extender

The ENET UEP-20 comes with a PCIe connection to any standard server, enabling the network appliance to handle x86 functionality and to offload NFV applications to the built-in FPGA.

Specifications Table

Specification	UEP20	
Ports and interfaces	2 x 1/10GbE SFP+ ports 8 x 1GbE RJ45 ports PCIe Gen2 x4	
Footprint	1RU Desktop (½ 19“ width)	
Weight	1.1 kg (2.4 lb)	
Dimentions (H x W x D)	(32.73 mm, 181.2 mm, 190.93 mm)	
Typical power consumption(*)	25W AC-12DC Power Adapter 10A	
Management	RS232 and JTAG *	
Sync-E	2 x SMA female connectors Micro USB for RS422	
Storage temperature	-40°C to 70°C / -40°F to 158°F	
Humidity	85%, non-condensing	
Operating temperature	-40°C to 65°C	

(*) Excluding optics

Features List

General
- Flow-based processor with L2/3/4 flow classification, hierarchical ACL
- Search engine up to 256K entries
- Switch, router, MPLS and load balancing functions
- Five-level packet header & payload manipulation and marking:
  - MPLS
  - PBB
  - QinQ (PB)
- Different editing on duplicated packets/multicast
- Supported encapsulations:
  - L2TP, PPPoE
  - GRE, NVGRE, VxLAN
  - IPinIP
- LAG (L2, L3, L4 distribution)
- ERPS, ELPS
- Wire speed NAT/NAPT*
- IP fragmentation*

Interfaces
- 2 x SFP+
- 8 x RJ45
- PCIe Gen2 x4
- 1 PPS for precision time

MEF Services
- E-LINE, E-TREE, E-LAN, E-ACCESS
- MEF 2.0 certified

Layer 1 Functionality
- Port mirroring
- Port protection
- Port reflection (LIN)
- Port advertising (Speed /Duplex)

Layer 2+ Functionality
- Non-blocking architecture
- MEF services and certifications
- All ports can serve as UNI/NNI
- Jumbo frames (up to 9,000 bytes) on all ports
- Q-in-Q, (802.1Q/802.1ad)
- ACL rules
- Tag swap
- Uni-directional link detection protocol (UDLD)
- Link layer discovery protocol (LLDP)
- <50ms protection LACP 1+1 (802.3ad)
- MSTP (802.1s)
- ELPS - G.8031/Y.1342
- ERPS - G.8032/Y.1344 v2
- OAM Protection and fault recovery
- Tunnel L2 protocols
- Learning table limit per VLAN/port
- Link aggregation (EtherChannel)
- Up to 256K MAC table
- L2 multicast up to 2K active multicast groups

OAM
- Service OAM 802.1ag CFM (MEP, MIP)
- Service OAM ITU-T Y.1731 PM (latency, jitter)
- Link OAM -802.3ah EFM
- Integrated OAM packet generator and analyzer
- RFC 2544
- OAM fast protecting (failover in uSecs)
- Four ME levels of TR-101

Classification and Filtering
- Packet classification based on first 196 bytes in packet (can be extended)
- Configurable per flow functional actions:
  - Filtering
  - Trapping
  - Mirroring
  - Packet editing
  - QoS remarking
- Hierarchical ACL, and mask configuration per field
- Rate dependent filters (e.g., limit rate of ingress IGMPv3 packets)

Traffic Management
- Support of jumbo frames up to 9KB
- Hierarchical QoS (H-QoS):
  - Three-level scheduler per MEF10
    - On port level
    - On service level
    - On flow level
  - Any combination can be mapped to a specific meter
- 256 virtual ports, each with 8 priority queues
- 2K queues
- Egress shaper per queue and each hierarchy:
  - Packet level
  - Byte level
- Configurable MTU per priority queues
- Scheduling
  - Strict priority
  - 2 levels of WFQ

Packet Editing
- Mapping 802.1p and DSCP QoS to queues
- Marking Priority 802.1p, IP ToS / DSCP bits
- Byte counts and FCS calculation
- VLAN modification (push/pop/modify)
- Header modification up to 48 bytes
- L2 and L3 loopbacks, including swap of MAC SA and DA, swap of IP

(*) Hardware ready

Layer 3 Functionality
- Protocols: OSPFv2, OSPFv3, BGP4/BGP4+, IS-IS
- VRRP, and IP tracking for VRRP
- Longest prefix match (LPM)
- IPv6 routing
- BFD
- VRF-Lite
- DHCP (client, server, relay, snooping)

IPSec
- IPSec tunneling in 10G rate for both encryption and authentication
- Supported crypto algorithms:
  - AES 128/256
  - SHA1/SHA2
    - SHA-224
    - SHA-256
    - SHA-384
    - SHA-512

Tunneling
- MPLS Layer 2 VPNs, E-LAN,
  - LDP, RSVP, RSVP-TE
  - Static labels
  - BFD (for OSPF, ISIS, LDP, RSVP)
  - PING and traceroute
  - MPLS PW
- VxLAN

(*) Hardware ready

Management
- Command line interface (CLI) via serial, TELNET, or SSH v1 and v2
- Simple network management protocol (SNMPv1, v2, and v3
- Remote monitoring (RMON)
  - Ethernet statistics (Group 1)
  - History (Group 2)
  - Alarm (Group 3)
  - Event (Group 9)
- Configuration files upload with FTP and SCP
- Time of day + calendar + time zone
- Internal syslog

Timing*
- For mobile deployments, the UEP offers Sync-E and IEEE 1588v2 with ordinary, transparent, and boundary clock capabilities.
- TR101, TR-156

Software
- ENET driver with ENET CLI with Application Guide
- ENET NPS full switch/router network protocol suite

CPU
- ARM dual-core Cortex 9